

345 P 380

Patent claims:

- 5 1. Antenna, in particular a mobile radio antenna for a base station, having the following features:
- at least one electrical or electronic component (319) is positioned in the antenna housing (307) or immediately adjacent to the antenna housing (307) and is connected for RF purposes to the antenna elements (315) which are associated with the antenna (301),
 - the electrical connection between the component (319) and the antenna elements (315) is made via an interface (321), such that at least two inner conductor sections (7a, 9a) and/or two outer conductor sections (7b, 9b) are coupled or can be coupled without any contact,
 - an antenna-side connecting section (7) and a connecting section (9), which interacts with it and is part of the component (319) which can be connected, are provided, and
 - the components (319) which can be connected to the antenna for RF purposes can be connected by pushing in or pushing out the at least one associated connecting section (9) into or out of the correspondingly designed antenna-side connecting section (7).
- 30 2. Antenna according to Claim 1, **characterized** in that both the inner conductor sections (7a, 9a) and the outer conductor sections (7b, 9b) of the at least two connecting sections (7, 9) of a connector are formed coaxially.
- 35 3. Antenna according to Claim 1 or 2, **characterized** in that the two connecting sections (7, 9) are provided with one or more spacers (51, 51a, 51b, 53, 53a, 53b)

in the area of their outer conductor coupling surfaces (107a, 109a) and/or their inner conductor coupling surfaces (107a, 107b), via which the inner conductor sections (7a, 9a) and/or the outer conductor sections (7b, 9b) are held spaced apart.

4. Antenna, in particular a mobile radio antenna for a base station, having the following features:

- at least one electrical or electronic component (319) is positioned in the antenna housing (307) or immediately adjacent to the antenna housing (307) and is connected for RF purposes to the antenna elements (315) which are associated with the antenna (301),
- the electrical connection between the component (319) and the antenna elements (315) is made via an interface (321), such that at least two inner conductor sections (7a, 9a) and/or two outer conductor sections (7b, 9b) are coupled or can be coupled without any contact,
- an antenna-side connecting section (7) and a connecting section (9), which interacts with it and is part of the component (319) which can be connected, are provided,
- the two connecting sections (7, 9) can be positioned with respect to one another via a holding device in an axial and/or radial relative position which can be predetermined, and
- the inner conductor and outer conductor sections (7a, 9a; 7b, 9b) which are respectively provided with the inner conductor coupling surfaces (107a, 107b) and with the outer conductor coupling surfaces (109a, 109b) are arranged in their functional position, without touching and without any insulating materials and/or any solid dielectric located between them.

5. Antenna according to one of Claims 1 to 4, **characterized** in that the component (319) which is to

be connected can preferably be connected and disconnected by pushing it in and out, respectively, after opening a closing cap or a closing cover, or a bottom boundary or some other housing boundary on the relevant interface (311) to the antenna elements (301) in the antenna housing (307).

6. Antenna according to one of Claims 1 to 5, **characterized** in that the two connecting sections (7, 9) can be rotated relative to one another about their concentric coaxial longitudinal axis, and/or in that the two connecting sections (7, 9) can be connected axially to one another in a different relative rotation position about their concentric coaxial longitudinal axis, and/or in that the two connecting sections (7, 9) are designed to be rotationally symmetrical, or essentially rotationally symmetrical, about their axial axis.

7. Antenna according to one of Claims 1 to 6, **characterized** in that the inner conductor coupling without any contact is in the form of a pot (109).

8. Antenna according to one of Claims 1 to 7, **characterized** in that the outer conductor coupling without any contact is in the form of a pot (109).

9. Antenna according to one of Claims 1 to 8, **characterized** in that the axial length of the inner conductor sections (7a, 9a) which are coupled without any contact corresponds to $\lambda/4$, preferably $\lambda/4 \pm$ less than 20%, preferably $\lambda/4 \pm$ less than 10%, and in particular of approximately or at least approximately $\lambda/4$ with respect to the frequency band to be transmitted, preferably with respect to the mid-frequency to be transmitted.

10. Antenna according to one of Claims 1 to 8, **characterized** in that the axial length of the outer

conductor sections (7b, 9b) which are coupled without any contact corresponds to $\lambda/4$, preferably $\lambda/4 \pm$ less than 20%, preferably $\lambda/4 \pm$ less than 10%, and in particular of approximately or at least approximately
5 $\lambda/4$ with respect to the frequency band to be transmitted, preferably with respect to the mid-frequency to be transmitted.

11. Antenna according to one of Claims 1 to 10,
10 **characterized** in that one inner conductor section (7a) is formed like a pot (109), forming an inner conductor recess (17) which extends axially from its end face, into which inner conductor recess (17) that inner
15 conductor section (9a) which is electrically connected to the other connecting section (9) can be inserted without touching it.

12. Antenna according to one of Claims 1 to 11,
20 **characterized** in that the outer conductor section (9b), which is located in the coupling area, of one outer conductor (9'b) is widened in the form of a pot with a larger internal diameter, to be precise holding the outer conductor section (7b) of the other connecting
25 section (7) which interacts with it.

13. Antenna according to Claim 12, **characterized** in that the outer conductor section (7b) of one connecting section (7) ends in the area of the outer conductor coupling surfaces (107a, 109a) without changing its
30 external and/or internal diameter.

14. Antenna according to Claim 12 or 13, **characterized** in that the internal and/or external diameter of the outer conductor section (7b) corresponds to the
35 internal and/or external diameter of the other outer conductor section (7b).

15. Antenna according to one of Claims 1 to 14, **characterized** in that two or more preferably coaxial

connecting sections (7 and 9) without any contact are combined to form a common multiconnector section.

16. Antenna according to one of Claims 1 to 15,
5 **characterized** in that at least one of the two connecting sections (7, 9) of the connector, or both connecting sections (7, 9), has or have an O-ring, preferably composed of silicone, which is provided in the area of the outer conductor coupling.

10 17. Antenna according to one of Claims 1 to 16, **characterized** in that the maximum axial insertion depth of the two connecting sections (7, 9) is limited by using an insulating spacer (51, 53).

15 18. Antenna according to one of Claims 1 to 17, **characterized** in that at least one connecting section (7 or 9, respectively) is directly firmly connected to an RF component (1 or 1', respectively) which is
20 associated with it.

19. Antenna according to Claim 18, **characterized** in that both connecting sections (7, 9) of a connection (5) are directly and firmly connected to the RF
25 component (1, 1') which is respectively associated with them, that is to say they are connected both electrically and mechanically.

20. Antenna according to one of Claims 1 to 18,
30 **characterized** in that at least one connecting section (7, 9) and preferably both connecting sections (7, 9) is or are connected or can be connected via a coaxial cable (3, 3') to an RF component (1, 1') which is associated with it or them.

35 21. RF connector according to one of Claims 1 to 18, **characterized** in that the size of the diameter of the inner conductors (7'a, 9'a) which are provided axially adjacent to the inner conductor coupling surfaces

(107a, 109a) of the connecting sections (7, 9) which are to be connected without any contact is at least approximately, and preferably, the same.

5 22. RF connector according to one of Claims 1 to 20,
characterized in that the internal diameter of the
outer conductors (7'b, 9'b) which are provided axially
adjacent to the outer conductor coupling surfaces
10 (107b, 109b) of the connecting sections (7, 9) which
are to be connected without any contact is at least
approximately, and preferably, the same.

23. RF connector according to one of Claims 1 to 21,
characterized in that the external diameter of the
15 outer conductors (7'b, 9'b) axially adjacent to the
outer conductor coupling surfaces (109a, 109b) is at
least approximately, and preferably, the same.

24. RF connector according to one of Claims 1 to 19,
20 **characterized** in that the connection without any
contact has different diameters for the inner and outer
conductors (7a, 7b; 9a, 9b).

25. RF connector according to one of Claims 1 to 24,
25 **characterized** in that the connection without any
contact with respect to the first connecting section
(7) and the second connecting section (9) has the same
characteristic impedance \pm less than 20%, preferably \pm
less than 10%, in particular approximately the same
30 characteristic impedance.

26. RF connector according to one of Claims 1 to 25,
characterized in that at least one connecting section
(7) has a coaxial cable which on the outside has an
35 insulating cable sheath (71), and in that the outer
conductor (9b) of the other connecting section (9)
clasps the cable sheath (71) with the outer conductor
(7b), which is located underneath it, of the first

connecting section (7) when they are inserted in one another.